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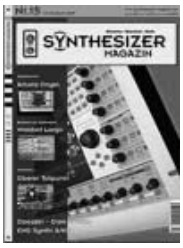
DARK ENERGY

Monophic Analog Synthesizer with USB and Midi Interface

Reports for download on our website:

KEYS 9/2009

BEAT 9/2009



Synthesizer Magazin Nr. 15

sonicstate.com (online review)

Dark Energy is a monophonic stand-alone synthesizer with USB and Midi interface. The sound generation and all modulation sources are 100% analog, only the USB/Midi interface contains digital components. Dark Energy is built into a rugged black metal case with wooden side plates. High quality potentiometers with metal shafts are used and each potentiometer is fixed to the case (no wobbly shafts and knobs). The distance between the controls is a bit wider compared to A-100 modules and knobs with vintage look are used.

Dark Energy contains these components:

VCO
- Triangle based VCO core
- manual tune control
- range switch -1 / 0 / +1 octave
- frequency range about 10Hz ... 12kHz
- FM (frequency modulation) control with modulation source switch (LFO1 / off / ADSR)
- manual pulsewidth control for rectangle waveform
- PWM control with modulation source switch (LFO2 / off / ADSR)
- waveform switch (sawtooth / off / triangle)
- external CV input for VCO frequency (1V/octave)
- external CV input for external PWM of the rectangle

VCF
- 24 dB low pass
- ~ 12 octaves frequency range
- manual frequency control
- tracking switch half - off - full
- XM: exponential FM (frequency modulation) control with modulation source switch (LFO2 / off / ADSR)
- LM: linear FM (frequency modulation) control to modulate the VCF by the triangle of the VCO in a linear (!) manner
- manual resonance control (up to self oscillation)
- external audio input
- external CV input for filter frequency
- 1V/octave tracking for usage of the VCF as a sine wave oscillator over some octaves

VCA
- manual amplitude control (initial gain)
- AM (amplitude modulation) control with modulation source switch (LFO1 / off / ADSR)
- external CV input for VCA amplitude

LFO1 and LFO2
- manual frequency control
- waveform switch (triangle / off / rectangle)
- range switch (low, audio, medium)
- LED display (dual green/red color for positive/negative share of the signal)
- the LFO1 signal is available as an additional socket (to use the LFO1 signal for external modules)

ADSR
- manual controls for Attack, Decay, Sustain, Release
- range switch (long, short, medium)
- blue LED display
- ADSR signal is available as an additional socket (to use the ADSR signal for external modules)
- External Gate input

USB/Midi-Interface
- Midi channel and reference note are adjusted by means of a learn button and LED at the rear panel
- The interface generates the gate signal that controls the envelope generator and four analog control voltages: CV1 is used to control the pitch of the VCO, CV2...CV4 can be patched and are controlled via pitchbend, Velocity/Volume and a freely assignable Midi controller
- All CVs and the gate signal are also available at the rear panel as jack sockets
- cascading of several units via internal Midi Out/Midi In connection (details on our website)

In/Outputs
- CV In VCO frequency (1V/oct)
- CV In VCO pulsewidth (about 5V range for full scale)
- CV In VCF frequency (~ 1V/oct)
- CV In VCA amplitude (0...+5V)
- Gate In (0/+5...12V)
- External Audio In (typ. 1Vss without distortion)
- inverted LFO1 Out (~ -2.5 ... +2.5V)
- Envelope Out (~ 0 ... +6V)
- Audio Out (typ. 1Vss)

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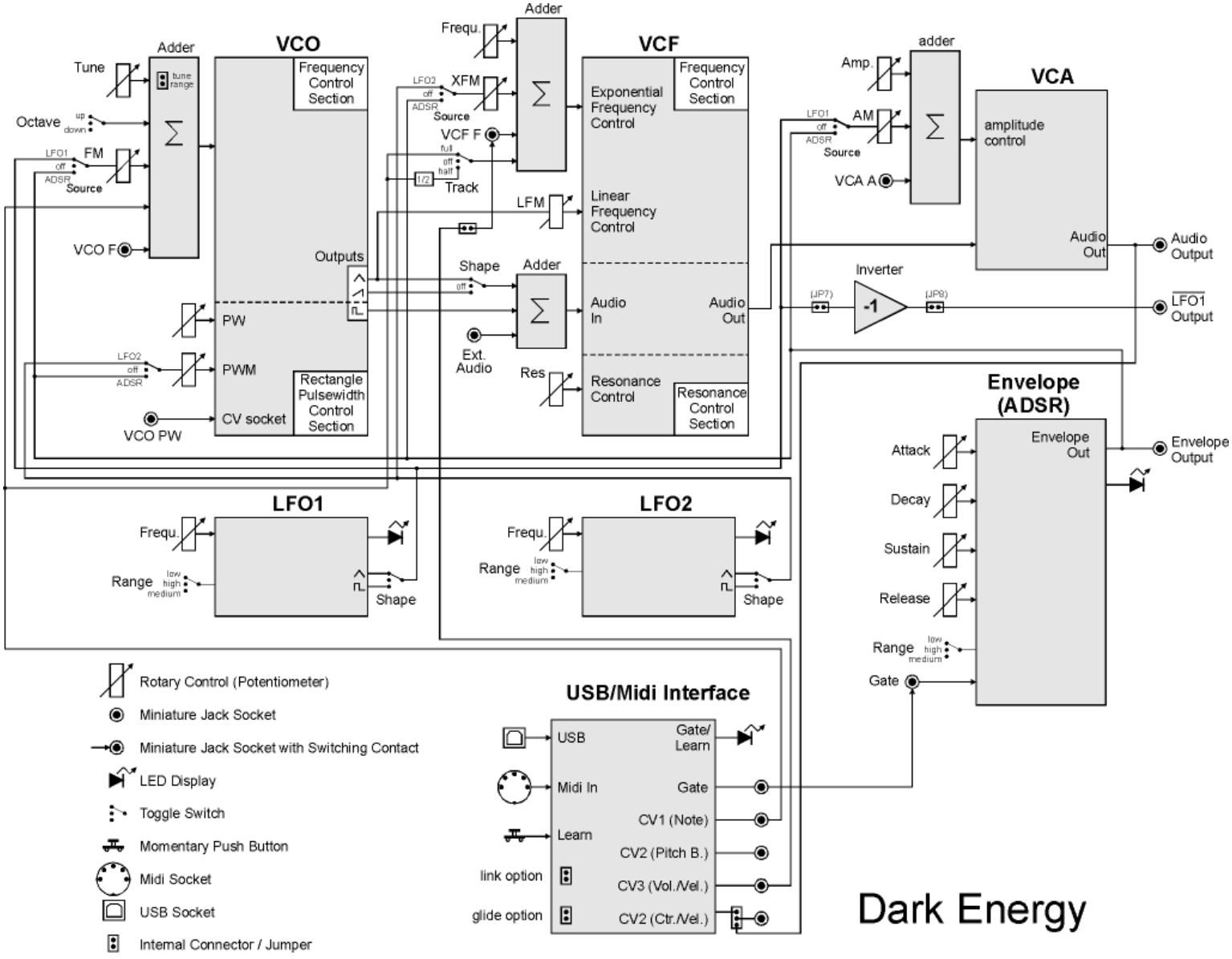
- USB
- Midi In
- Learn button
- Gate Out (with LED for Gate display and learn function), 0/+5V
- CV1 (note), CV2 (pitch bend), CV3 (velocity/volume),CV4 (freely assignable controller)
- power supply (12-15V AC, 400mA)

Additional remarks and specs:

- As the LFO frequencies can go up to moderate audio range (~ 5kHz) even audio FM effects of VCO (pitch and pulsewidth), VCF and ADSR are possible !
- When the VCO is turned off (waveform switch = center position, pulsewidth control = fully CCW) and the VCF resonance is set to maximum the module can be used as a sine oscillator. The sine can be modulated in a linear manner from the triangle wave of the VCO and by LFO2 in an exponential manner at the same time !
- Dimensions: overall about 185 x 145 x 65 mm, about 145 x 135 x 55 without wooden site plates
- Weight: about 1.2 kg
- Distance between the knobs (center - center): ~ 25 mm, diameter of the knobs: ~ 15 mm
- The metal case is made of 1 mm steel, black coated with white printing
- Overall dimensions: overall about 185 x 145 x 65 mm
- Dimension of the metal case (without side plates): about 145 x 135 x 55
- Side plates dimensions: about 145 x 65 x 12 mm (the width has been changed from 20 to 12 mm)
- The wooden side plates can be removed if desired. They are mounted by means of two screws to the metal box. The holes in the metal box can be used also to mount several devices together (e.g. with common wooden side plates on both ends).
- The device can be positioned horizontal (desk top) or vertical
- These parts are included: power supply (12-15V AC) for 230V mains voltage with European mains plug, one cable 3.5 mm - 6.3 mm /1/4" jack plug, one USB cable (type A-B) and two A-100 patch cables
- Powering the device via USB is not possible, because the analog circuits require a dual voltage (+/-12V).
- Dark Energy is the stand-alone version of the module A-111-5



sketch

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d3 MODULAR ORGAN MASTER KEYBOARD

d3 complete system with black case and wooden sideplates

d3 is a modular organ masterkeyboard system and is intended in the first place as a control unit for organ emulations like Native Instruments B4 or Emagic evb3. The system has two modules available: the **keyboard unit d3m** and the **drawbar control unit d3c**. Each of the modules can be used alone or in combination with other modules of the system. The maximum system consists of two keyboard units d3m and one control unit d3c. The housings of the d3 system are available in black or silvergrey color.

d3m Waterfall Keyboard Unit

d3m with silver-grey housing

The first component of the d3 system is a 5 octave ***waterfall* organ keyboard** with 22 buttons for program change. Each button is equipped with a blue LED. Following previous organ designs the buttons are organized as 10 preset bank buttons and 12 preset number buttons. The 12 number buttons correspond to the different colored lowest octave that was available in previous organs. Additionally a foot controller and a foot switch can be connected. Both are programmable (e.g. volume for the foot controller and sustain or rotary speaker on/off for the foot switch).

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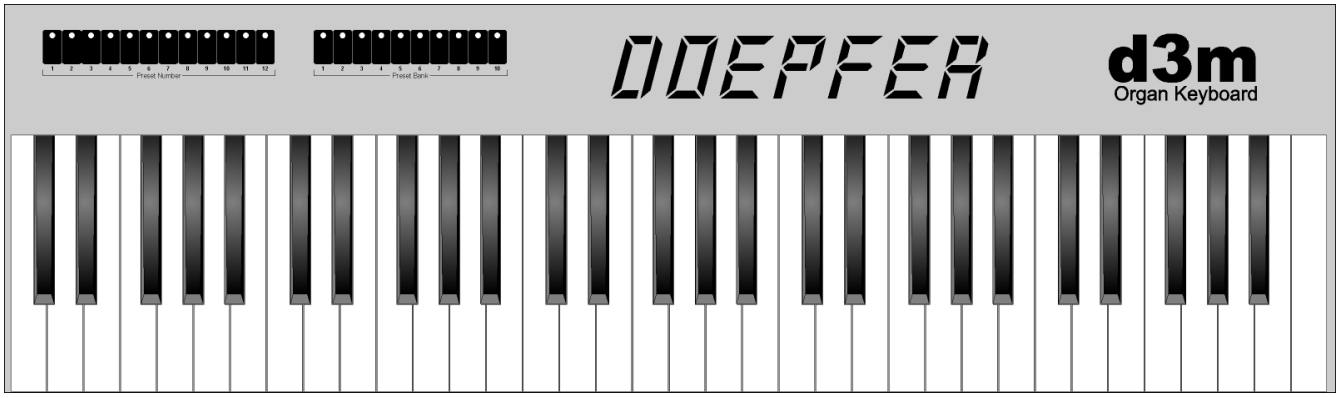
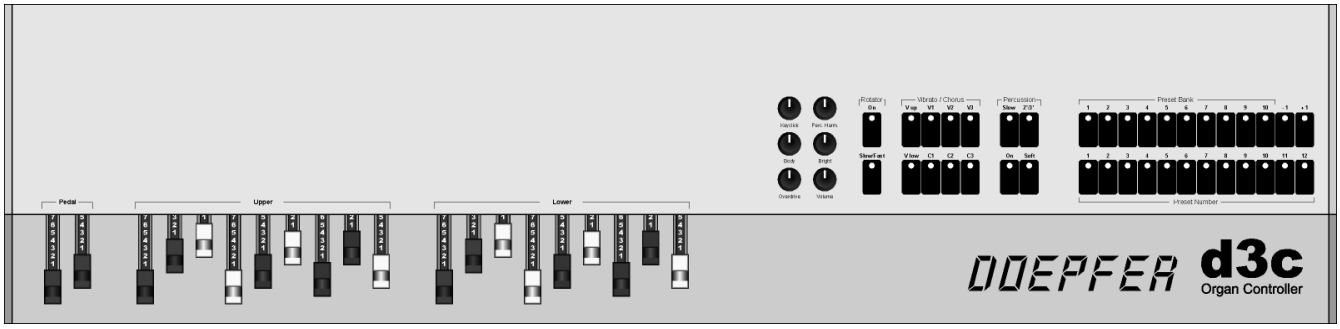


d3m sketch

The keyboard is equipped with Midi In and Midi Out. Two (or even more) of these keyboards can be daisy-chained via midi out/in as upper/lower manual. The keyboards are distinguished by different midi channels. The connections to the planned bass pedal d3b and to the control unit d3c are established via Midi too.
Two (or more) d3m keyboards can be mounted together. For this threads are available at the rear and bottom side of the case. By means of mounting angles the keyboards can be mounted together in two ways: with hidden or accessible button section of the lower keyboard (see sketches on next page). These threads are even used to mount the optional control unit d3c. The case is made of black or silvergrey coated aluminium.
The measures are about L87xT25xH9 cm and the weight is about 6.5 kg.

d3c Drawbar Control Unit

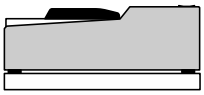


d3c sketch

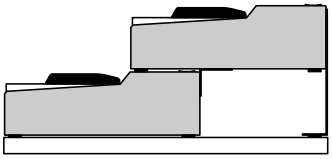
Part two of the modular concept is the **drawbar control unit**. This unit contains all elements required to control an typical organ emulation. These controls are available: 9 drawbars for upper manual, 9 drawbars for lower manual, 2 drawbars for bass pedal, 6 rotary controls for the parameters of tube and percussion and a lot of additional buttons for vibrato, chorus, key click, rotary speakers and so on. Even the 10 + 12 program selection buttons of the keyboard unit d3m will be available. This is necessary if the (one or two) d3m are mounted with hidden button sections. The connection between all modules (d3m, d3c, d3b) is established via Midi. The control unit d3c is equipped with both Midi and **USB** interface. This allows to connect the d3 combination to both worlds Midi and USB (e.g. a laptop that runs B4 or evb3).
The case is made of black or silvergrey coated aluminium. The measures are about L87xT20xH5 cm and the weight is about 3.5 kg.
The control unit d3c can be used as a stand-alone device or in combination with one or two of the d3m keyboards described above (and d3b as soon as it is available). In the last case the buttons of the keyboard(s) are (alternatively) covered by the control unit as all control functions (including program change) are now taken over by the control unit. The control unit can can be combined with one or two keyboards by means of the mounting angles mentioned above. The pictures on the next page show some examples of d3m/d3c combinations.

d3 complete system with silvergrey case and wooden sideplates

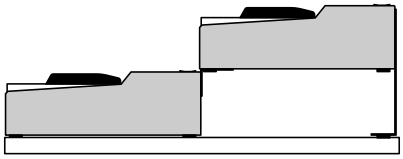
The following pictures show some examples of d3m/d3c combinations.



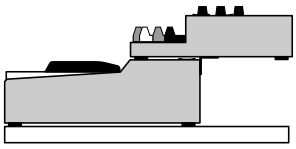
d3m



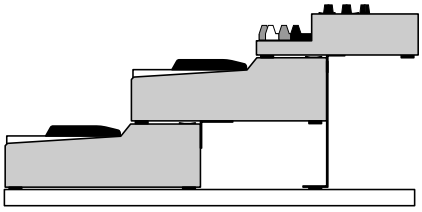
2 x **d3m** (version 1)



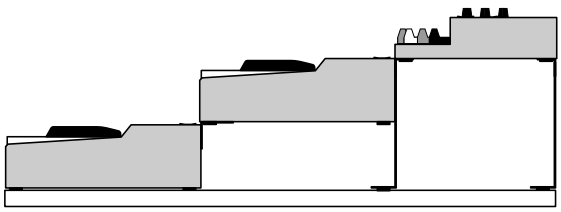
2 x **d3m** (version 2)



d3m + **d3c**



2 x **d3m** + **d3c** (version 1)



2 x **d3m** + **d3c** (version 2)

These d3 system extensions are available too:

- mahagony stained wooden side plates for a single d3m
- mahagony stained wooden side plates for the complete system made of two d3m and one d3c (please refer to the picture on page 1), i.e. combination "version 1" of the above sketches with 2xd3m+d3c
- mounting angles to connect two d3m, or d3m and d3c
- support brackets for rear d3m (if two d3m are mounted together)
- laptop support for d3c (mounted left from the controls of the d3c), black or silvergrey

We think also about a bass pedal unit (d3b) as the third component of the d3 system. But this unit will be available not before middle of 2009. We still consider which type of pedal and housing should be used. Our bass pedal manufacturer offers only bass pedals with 13, 17 or 20 keys. But we would like to release a bass pedal with 25 keys. So far the only solution would be the combination of two non-dynamic 13-keys pedals to obtain a larger pedal. Even the type of housing (metal housing like d3m/d3c, or wood, or flightcase-type) is still under discussion.
More detailed information about the d3 system can be found on our web site www.doepfer.com.

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MIDI RIBBON/ TRAUTONIUM CONTROLLER R2M

R2M is a **ribbon controller** that generates control signals by moving the finger on the ribbon manual. The output signals are generated as **Midi** and **CV/Gate** control voltages simultaneously. Consequently R2M allows to control both Midi and CV/Gate based equipment (e.g. analog synthesizers or analog modular systems). R2M is the abbreviation for Ribbon to (2) MIDI.
R2M is made of two parts: the **manual** and the **control box**. For the manual the same type as the for the modular version A-198 is used. It includes a 50 cm position sensor and a pressure sensor. The control box converts the data coming from the manual (finger position and pressure) into the corresponding Midi data resp. CV/Gate voltages. The control box is available even without manual to make use of an already existing A-198 manual and take advantage of the additional features of the **R2M** control unit compared to the comparatively simple A-198. These are the most important **R2M** features:

1. Manual
- ❑ precise and sensitive **position sensor** (length 50 cm) that responds even to light finger touch
- ❑ **pressure sensor** located below the position sensor
- ❑ solid metal frame (double U-shape profile), silver-grey color
- ❑ several M3 threads on all sides (e.g. to mount the manual on a base or to mount several manuals together or ...)
- ❑ measures: ~ 600 mm length x 30 mm width x 18 mm height
- ❑ weight: about 900 g
- ❑ connection to the control box via 4-pin cable (same as used for USB connections but no USB function), 1m cable included

2. Control Box
- ❑ receives the analog resistance data coming from the position and pressure sensor of the manual and converts these information into Midi date resp. CV/Gate voltages
- ❑ operation via 10 buttons, 6 blue LEDs and illuminated 2 x 16 character LCD
- ❑ these MIDI messages can be assigned to the two sensors:
- ❑ note on/off without pitch bend
- ❑ note on/off with pitch bend
- ❑ pitch bend, after touch, any control change number
- ❑ program change
- ❑ "Trautonium" mode: in this special mode only a single note on message is generated when the position sensor is touched. After that only pitch bend messages are generated until the finger is lifted off. Attention! This mode requires that the MIDI receiver offers a sufficient pitch bend range (5 octave for max. R2M use) and resolution so that no steps are heard over the complete range. For details about the **Trautonium** please look at our web site.

- ❑ complete range. For details about the **Trautonium** please look at our web site.

- ❑ Adjustable pitch bend width to adjust the R2M pitch bend to the receiver's pitch bend
- ❑ 12 bit pitch bend resolution
- ❑ MIDI channel, control change number and pitch scale can be adjusted
- ❑ quantization option, i.e. only certain notes resp. control voltages (e.g. only major or minor notes) are generated. For details please refer to the A-100 quantizer module A-156 as the quantization of the R2M is very similar.
- ❑ adjustable manual scaling (i.e. which length of the manual corresponds to one octave, full length is max. 5 octaves)
- ❑ inverse scaling is possible (important if e.g. the manual is put on with a strap)
- ❑ MIDI output
- ❑ resolution of the analog manual data: 12 Bit
- ❑ simultaneous output of MIDI data and CV/Gate voltages
- ❑ 2 CV outputs:
- ❑ CV1 outputs the position sensor data (1V/octave standard, 0...max. +5V, i.e. max. 5 octaves)
- ❑ CV2 outputs the pressure sensor data (0...+5V)
- ❑ Gate output (corresponds to CV1)
- ❑ Gate can be configured as voltage gate (0/+5V) or switched trigger (jumper inside the box)
- ❑ adjustable gate polarity:
- ❑ normal: 0 -> +5V when the sensor is touched
- ❑ inverse: +5V -> 0V when the sensor is touched
- ❑ CV output resolution: 12 Bit
- ❑ all settings (e.g. scaling, quantization, arpeggio and so on) affect both MIDI and CV/Gate outputs
- ❑ CV hold and active Gate are possible at the same time (was not possible for the A-198)
- ❑ no CV drift in hold mode (A-198 has a small CV drift in hold mode)
- ❑ 16 user defined presets (i.e. non volatile memory for 16 complete settings of the unit)
- ❑ solid, silvergrey metal case (desktop shape)
- ❑ measures: about 128 width x 91 depth x 26 height (front) resp. 42 height (rear, because of desktop shape, measures in mm)
- ❑ weight: about 400g
- ❑ external power supply (7-12V DC / min. 250mA required)
- ❑ same manual as A-198 (if you already own an A-198 only the R2M control box is required)

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LMK4+

NEW: with USB
even with 76 keys available
at present only special edition with
grey case and grey front panel available

Midi/USB Master Keyboard

LMK4+ is a high class Midi and USB masterkeyboard. Here is a list of the most important features of the LMK4+:

- 76 or 88 keys with real piano style action with hammer mechanics
- Built into a black flight case with removable lid
- 2-line, 16-character LC display, adjustable backlight/contrast
- 24 function buttons grouped in three rows of 8
- 8 LEDs (indicators for the top row of buttons)
- 2 wheels (one spring-loaded), 2 sliders, 1 rotary knob
- 1 rotary encoder (endless rotary switch)
- Monophonic after touch (channel after touch)
- Velocity, max. 127 steps resolution (dependig upon selected velocity curve)
- External ¼" input jack for double footswitch
- 2 External ¼" input jacks for sweep pedals
- two separate Midi outputs
- USB interface (outputs data of Midi output #1)
- Midi input, treated as a separate split zone (e.g. for connecting another keyboard or bass pedal)
- Wheels, sliders, after touch sensor, rotary potentiometer, pedals and foot switches can be assigned to any Midi controller (or pitch/after touch)
- Additional transmitted Midi messages:
  - Program change
  - Program bank (controllers #0 and #32)
  - Start, Stop, Continue, Clock
  - All notes off on all Midi channels (panic key)
- Foot switch activated preset change
- Preset change via incoming program change messages (disengageable)
- 32 velocity and 8 aftertouch response curves
- 8 user definable controllers (controller no # 0...127 can be assigned)
- Adjustable velocity response reduction factor for black keys
- Adjustable aftertouch effect if assigned to pitch bend (positive/ negative effect)
- Proportional volume control of different zones with one controller
- 128 total presets. The following parameters can be adjusted/defined by the user in each preset:
  - Assignment of controllers (wheels, sliders, rotary knob, pedals, footswitches, etc.) to Midi functions (pitch bend, modulation, after touch, volume, panorama, portamento, sustain, soft pedal, sostenuto and 8 user-defined controllers)
  - Name of the preset (up to 8 characters)
  - Preset tempo (Midi clock)
  - Transmission of Start, Stop or Continue at time of preset call-up
  - Preset pointer (number of the next preset selected via footswitch, loops are possible)
  - Definition of 8 overlapping keyboard zones. The following features can be defined/adjusted by the user in each zone:
    - zone used for internal keyboard or Midi input
    - Upper/lower key
    - Midi channel (1...16)
    - assigned Midi output (1, 2, both or none)
    - any transposition in half-note increments/ decrements
    - Selection of one of 32 velocity and one of 8 aftertouch response curves
    - Activity of each controller on/off
    - Program change, bank no (ctr.#0/32) and volume sent when preset is called up (disengageable)
    - Piano mode on/off (i.e. sending of a note-on event at minimal key motion)
- Dump function (for single presets or the entire preset memory)
- Dimensions: about 139/155x27x11 cm (76/88 keys)
- Weight: about 22/24 kg (76/88 keys)
- XLR connector for external power supply
- external 115...230V power supply with europlug mains connector is included
- For other mains connector types or other mains voltages the power supply has to be purchased by the customer in his country (7...12V DC, 500mA with XLR femal connector required)

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NEW: Midi and USB even with 76 keys available

Hammer + Flightcase

LMK2+

Midi/USB Master Keyboard

LMK2+ is a high quality Midi/USB masterkeyboard for all applications where extraordinary masterkeyboard functions are not required but a high quality keyboard with real piano style hammer mechanics, aftertouch and two wheels are indispensible (if you need high level masterkeyboard functions see LMK4+).

- 76 or 88 keys with real piano style action with hammer mechanics
- Built into a black flight case with removable lid
- Monophonic aftertouch (channel aftertouch)
- Velocity, max. 127 steps resolution, dependig upon selected velocity curve
- 8 velocity response curves
- 2 wheels: the spring-loaded one is used for pitch-bend, the other can be assigned to any Midi Controller from #0...#31 (e.g. #1 = Modulation)
- External ¼" input jack for double-footswitch (Sustain and Sostenuto function)
- External ¼" input jack for sweep pedal (Volume function)
- After touch, wheels, ext. footswitches and pedal can be turned on/off in each zone
- Midi output
- USB interface (outputs the same data as the Midi output)
- 3-digit LED display
- 8 menu-buttons with LED indicators
- Adjustable velocity reduction factor for black keys
- Non volatile memory for the latest keyboard configuration
- The following additional Midi messages are transmitted (in connection with keyboard keys)
  - Program change
  - Program bank (controllers #0 and #32)
  - Start, Stop, Continue
  - All notes off on all Midi channels (panic key)
- Four overlapping keyboard zones. The following features can be defined or adjusted by the user in each of the 4 zones
  - Upper/lower key of the zone
  - Midi channel (1...16)
  - Any transposition in half-note increments/ decrements
  - Selection of one out of 8 velocity response curves
  - Activity of wheels, after-touch, foot-switches and foot controller on/off
  - Controller number for wheel #2
  - Piano mode on/off (i.e. sending of a note-on event at minimal key motion)
- Dimensions: about 132/148 x 28 x 12 cm (76/88 keys)
- Weight: about 22/24 kg (76/88 keys)
- XLR connector for external power supply
- external 115...230V power supply with europlug mains connector is included
- If the LMK2+ is connected to USB no external power required provided that the USB host is able to deliver 200 mA current
- For other mains connector types or other mains voltages the power supply has to be purchased by the customer in his country (7...12V DC, 500mA with XLR femal connector required)

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PK88

Midi/USB Keyboard

NEW: Midi and USB even with 76 keys available

Hammer + Flightcase

PK88 was designed especially for the requirements of the "mobile pianist" who needs a high class and easy to carry keyboard but is able to dispense with extended Midi features. In the first place PK88 was made to be combined with a piano expander or a computer with Midi or USB interface and suitable sound generation software.
The PK88 uses a 76 or 88 keys keyboard with real hammer mechanics (same type of keybed as used in our master keyboards of the LMK-plus series). The case used is a rugged and easy to carry black flightcase with handle and removable lid.
The Midi features are limited to what the user of such a keyboard really needs: PK88 transmits Midi note messages on Midi channel 1. The velocity resolution is 127 steps. We set a high value on the conversion of the mechanical impact to the Midi velocity so that it is as close as possible to the bevaviour of a real piano - within the limited possibilities of Midi.

At the rear panel a double foot switch and a foot controller can be connected to obtain the piano features sustain (controller #64) and soft pedal (controller #67), as well as loudness control (controller #7). E.g. our double footswitch VFP2 and foot controller FP5 can be used. At the rear panel you will find also the Midi output, the USB connector and the power supply connector (XLR type). The USB interface outputs the same data as the Midi out socket.
An external 115...230V power supply with Europlug mains connector is included with the PK88. For other mains connector types or other mains voltages the power supply has to be purchased by the customer in his country (7...12V DC, 100mA with XLR femal connector required). If the PK88 is connected to USB no external power supply is required as in this case the device is powered via USB.
The dimensions are about 128/137 x 28 x 12 cm, the weight is about 18/20 kg (specs for 76/88 keys).

Keyboard Accessories

VFP2 double foot switch
about 1m cable length, stereo jack plug 1/4", 2 contacts closed at rest (suitable e.g. for LMK4+, LMK2+, PK88 or A-177-2)
dimensions:
overall: ~ 20 x 22 x 6 cm

VFP1 single foot switch
same as VFP1, but only one switch, about 1m cable length, mono jack plug 1/4", 1 contact closed at rest (suitable e.g. for d3m, CTM64, MKE or even for LMK4+, LMK2+ or PK88 if only the sustain function is required)

FP5 foot controller
about 1m cable length, Stereo jack plug 1/4", potentiometer 10k linear (suitable e.g. for LMK4+, LMK2+, PK88 or A-177-2)
dimensions:
overall: ~ 25 x 12 x 11 cm (down position) resp. 25 x 12 x 15 cm (up position)

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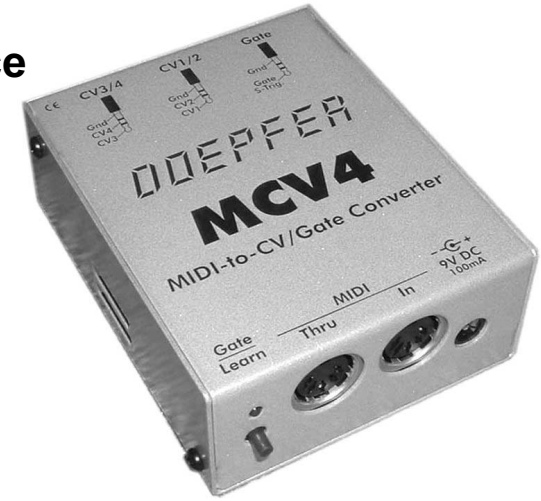
MCV4

MIDI to CV/Gate Interface



MCV4 is a low-cost interface to control vintage monophonic synthesizers via MIDI:

- ❒ 4 analog control voltages CV1...CV4, voltage range 0...+5V, 8 bit resolution
- ❒ CV1 = pitch control (VCO), 1V/octave, controlled by MIDI note on/off and pitch bend (1/4 semitone resolution)
- ❒ CV2...4 = voltage control of other functions (e.g. VCF frequency, volume) controlled by monophic after touch (CV2), velocity/volume (CV3) and selectable MIDI controller (CV4)
- ❒ 3 gate output types selectable via jumper inside the device: voltage trigger (+5V or power supply voltage) or S-trigger
- ❒ MIDI channel and reference note for CV1 = 0V adjustable via learn button
- ❒ Different assign modes for CV1 (highest note, last note, reference note)
- ❒ Retrigger on/off while playing legato
- ❒ Gate/trigger polarity normal/inverse
- ❒ Two 1/4" stereo jack sockets for CV1/2 and CV3/4 (cable 1/4" stereo -> 2x1/4" mono required, not included, pls. order in addition)
- ❒ 1/4" mono jack socket for gate/trigger
- ❒ Learn button with LED for adjusting MIDI channel, reference note for CV1, controller for CV4 and other parameters
- ❒ Optical display of gate/trigger via LED
- ❒ MIDI-In, MIDI-Thru
- ❒ Non-volatile memory for parameter settings
- ❒ Metal case, approx. 95x75x35 mm
- ❒ External power supply 9...12V/100mA
- ❒ Adapter for 230V AC with Europlug mains connector is available, adapters for other voltages or other mains connector types have to be purchased by the customer in his country

MSY2

MIDI to Sync/Clock Interface

MSY2 is an interface to control vintage drum computers or sequencers that use the SYNC standard (e.g. Roland TR808 rhythm composer, TB303 bass line). MSY2 converts the MIDI realtime events Clock, Start and Stop into the corresponding signals Clock and Start/Stop of the Sync standard. Sync Clock is a periodic signal (0/+5V) representing the tempo. Sync Start/Stop is a signal that indicates one of the 2 possible states: Start = +5V, Stop = 0V.

- ❑ 2 SYNC DIN sockets (switched in parallel)
- ❑ Clock miniature jack socket 3.5mm e.g. to control the arpeggiator of a synthesizer
- ❑ LED display of Clock and Start/Stop
- ❑ MIDI-In, MIDI-Thru
- ❑ Clock conversation rate between MIDI clock and Sync clock adjustable via DIP switch in the range of 1...16 (clock dividing factor)
- ❑ Start/Stop polarity and Clock polarity adjustable via DIP switches (for applications not following the SYNC standard)
- ❑ Metal case, approx. 65x60x40 mm
- ❒ External power supply 9...12V/100mA
- ❒ Adapter for 230V AC with Europlug connector is available, adapters for other voltages or mains connector types have to be purchased by the customer in his country
- ❒ Power supply via MIDI In is possible if the MIDI controlling device corresponds 100% with the MIDI hardware standard. A jumper inside the MSY2 is used to select the type of power supply. The factory setting is for external power supply as the external power supply version will work in any case. You may try out with your MIDI device if the power supply via MIDI will work.

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MAQ16/3 MIDI Analog Sequencer

special version with blue LEDs available (extra charge)

Designed in Cooperation with the German Band KRAFTWERK

Fans of vintage analog sequencers will be glad of the MAQ16/3. It combines the creative potential of an analog sequencer with the advantages of MIDI. MAQ16/3 outputs the sequencing data both as control voltages (CV) and as MIDI data. MIDI Out of the MAQ may be connected to MIDI In of any sound generating MIDI device (synthesizer, sampler) or to a computer sequencer recording the MAQ data. Additionally 3 control voltage and gate outputs are available for controlling vintage synthesizer equipment (e.g. the A-100 Analog Modular System). The main feature of the MAQ is the real time access to the sequence via 48 rotary potentiometers grouped in 3 rows of 16 dials each. All important parameters like first/last step, MIDI event, MIDI channel, forward/backward/random/pendulum mode, gate time, tempo and so on are independently assigned to each row and can be changed in real time while the sequence is running. This enables very complex sequences. The rows may not only be used for generating note events but also other MIDI events or for controlling the length of time for each step. Of course the MAQ allows the synchronisation via MIDI Clock, Start and Stop either as master or as slave.

- ❑ MIDI Sequencer featuring analog inputs
- ❑ 3 rows of 16 knobs and LEDs (red or blue) each
- ❑ Grey 19-inch rack-mount unit (4 U)
- ❑ Assignable MIDI-Events and MIDI-Channels for the 3 rows:
- ❑ ❑ Note On/Off
- ❑ ❑ Velocity
- ❑ ❑ Controller (0...127), Pitchbend, Aftertouch mono and poly
- ❑ ❑ Program Change (for dynamic sound change)
- ❑ ❑ MIDI channel of another row (for dynamic sound change)
- ❑ ❑ Transposition of another row
- ❑ ❑ Gate time (length of time for this column)
- ❑ First/last step of each row adjustable
- ❑ MIDI channel of each row selectable
- ❑ Available modes for each row: Forward/Backwards/Pendulum/ Random
- ❑ Different timings for each row (synchronized by MIDI clock)
- ❑ Transposition via incoming note on events possible
- ❑ Muting of single steps and complete row possible (also via incoming Program change or note events)
- ❑ External Synchronisation (via MIDI Start/Stop/Clock In) or
- ❑ Internal Synchronisation (MAQ transmits MIDI Start/Stop/Clock Out)
- ❑ 32 Sequence memories (Presets) in non-volatile memory
- ❑ Full editing capabilty of all preset parameters
- ❑ Remote control of important parameters (first/last step, mode, event type, mute step, mute row and so on) via program change and Note events (no Sy-Ex necessary)
- ❑ 3-digit, 7-segment display
- ❑ Operation via 8 buttons with LEDs
- ❑ Rotary encoder for rapid input of all parameters
- ❑ 3 CV and Gate outputs (3.5 mm jack sockets on rear panel)
- ❑ Dimensions: 480 x 177 x 110 mm (19" /4 HU)
- ❑ Weight: about 3 kg
- ❑ External 115...230V power supply with europlug mains connector is included
- ❑ For other mains connector types or other mains voltages the power supply has to be purchased by the customer in his country (9...12V DC, 500mA required)

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